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Letter dated 3 November 2017 from the Secretary-General addressed to the President of the Security Council

I have the honour to transmit herewith a letter dated 2 November 2017 from the Director General of the Organisation for the Prohibition of Chemical Weapons (OPCW) (see annex). The letter transmits the report of the OPCW Fact-Finding Mission in the Syrian Arab Republic regarding the alleged incident in Lataminah, Syrian Arab Republic, on 30 March 2017.

I should be grateful if you could bring the present letter and its annex to the attention of the members of the Security Council.

(*Signed*) António **Guterres**

17-19644 (E) 071117

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Annex

[Original: Arabic, Chinese, English, French, Russian and Spanish]

I have the honour to transmit to you herewith a note by the Technical Secretariat entitled "Report of the Organisation for the Prohibition of Chemical Weapons Fact-Finding Mission in the Syrian Arab Republic regarding an alleged incident in Lataminah, Syrian Arab Republic, 30 March 2017" (see enclosure).

(*Signed*) Ahmet **Üzümcü**

Enclosure

[Original: Arabic, Chinese, English, French, Russian and Spanish]

Note by the Technical Secretariat

Report of the Organisation for the Prohibition of Chemical Weapons Fact-Finding Mission in the Syrian Arab Republic regarding an alleged incident in Lataminah, Syrian Arab Republic, 30 March 2017

1. SUMMARY

1.1 The OPCW Fact-Finding Mission (FFM) was alerted to allegations of use, on 30 March 2017, of a chemical as a weapon in Ltamenah, Hama Governorate, whilst analysing information in relation to an earlier allegation in a different area of the same town. Whilst the use in Khan Shaykhun on 4 April 2017 became the main priority, additional information became available with regard to gathering facts in relation to potential use in Ltamenah.

1.2 As it was unable to visit the location of the alleged incident shortly after the incident, the FFM interviewed a variety of witnesses, including casualties and treating medical staff, and received environmental samples, including munition parts, in a neighbouring country.

1.3 The conclusions were derived from the analysis of interviews, supporting material submitted during the interview process, analysis of environmental samples, and subsequent cross-reference and corroboration of the evidence.

1.4 Given limitations in some of the evidence, the FFM has not been able to determine with absolute certainty the use of a chemical weapon. Nevertheless, sufficient facts were collected to allow the FFM to determine:

(a) the presence of sarin on samples which came from the alleged site of the incident;

(b) that casualties from that site and time period displayed symptoms and received treatment consistent with exposure to sarin; and

(c) that munition parts from the alleged site of the incident were consistent with application in a chemical weapon.

1.5 Therefore, the FFM is able to conclude that sarin was more than likely used as a chemical weapon on 30 March 2017 in the south of Ltamenah.

2. LEGAL FRAMEWORK

2.1 The FFM was set up in May 2014 "to establish facts surrounding allegations of the use of toxic chemicals, reportedly chlorine, for hostile purposes in the Syrian Arab Republic" on the basis of the Director-General's authority under the Chemical Weapons Convention (hereinafter the "Convention") to seek to uphold at all times the object and purpose of the Convention, as reinforced by the relevant decisions of the OPCW Executive Council (hereinafter the "Council") and by United Nations Security Council resolution 2118 (2013).

2.2 The Terms of Reference of the FFM were mutually agreed upon by the OPCW and the Syrian Arab Republic through the exchange of letters between the OPCW Director-General and the Government of the Syrian Arab Republic, dated 1 and 10 May 2014, respectively (Annex to the Note by the Technical Secretariat S/1255/2015, dated 10 March 2015).

2.3 The continuation of the FFM was subsequently endorsed by the Council in decision EC-M-48/DEC.1, dated 4 February 2015, as recalled by United Nations Security Council resolution 2209 (2015), and subsequently decision EC-M-50/DEC.1, dated 23 November 2015. Both of these Council decisions and resolution 2209 (2015) require the FFM to study all available information relating to allegations of the use of chemical weapons in the Syrian Arab Republic, including that provided by the Syrian Arab Republic and by others.

2.4 The FFM is also referred to in United Nations Security Council resolution 2235 (2015) establishing the OPCW-United Nations Joint Investigative Mechanism (JIM) and United Nations Security Council resolution 2319 (2016) extending the mandate of the JIM by one more year.

2.5 The scope of the FFM's mandate does not include the task of attributing responsibility for the alleged use.[1]

[1] Fifth preambular paragraph of EC-M-48/DEC.1; sixth preambular paragraph of EC-M-50/DEC.1; eighth preambular paragraph of United Nations Security Council resolution 2235 (2015).

3. METHODOLOGY

3.1 The FFM followed the same methodology as in previous missions. This methodology has been comprehensively described in previous reports and therefore will not be repeated in such detail here.

3.2 Whilst the overarching methodology has been consistently applied in establishing facts related to the use of chemicals as weapons in Syria, there is a unique set of circumstances presented by each allegation. These circumstances include access to physical evidence, electronic evidence, witnesses, and documentation, in addition to evaluating the time lag between the allegation and access. As such, the differing circumstances of each allegation assign lesser or greater relevance to the various components of the detailed methodology.

3.3 In particular, the evidentiary value of samples taken close to the time of the allegation, supported by photographic and video evidence and in association with witness testimony, was balanced against the evidentiary value of the FFM visiting the site some time later to collect its own samples.

3.4 Accordingly, the FFM reviewed and compared the methodology in S/1318/2015 (including Rev.1 and Rev.1/Add.1), S/1319/2015, S/1320/2015, S/1444/2016, S/1491/2017, and S/1510/2017 to ensure that, with respect to previous allegations, there was consistent application of investigative approach.

3.5 The FFM looked at the combination, consistency, and corroboration of the evidence gathered as a whole, rather than the individual items of evidence taken in isolation, in order to reach its conclusions.

3.6 Reference documentation is listed in Annex 1.

4. DEPLOYMENT DETAILS AND CHRONOLOGY

Pre-deployment

4.1 After an incident in Ltamenah was reported in the media on 25 March 2017, the FFM continued with open-source research and commenced the collection and review of all relevant information concerning the allegation (Annex 2). The majority of sources consisted of news media, blogs, and the websites of various non-governmental organisations (NGOs).

4.2 In the course of this process, the FFM identified an additional allegation in the Ltamenah area, initially from contacts in NGOs, but also as reported in the media as occurring on 30 March 2017. Subsequently, the FFM expanded the search for potential interviewees and possible evidence to include this allegation.

4.3 Active monitoring of the media by the Information Cell (of the Secretariat) and FFM continued. This allowed the FFM to locate the potential area of the alleged incident, as well as initiate the identification of potential interviewees and possible evidence.

4.4 During this pre-deployment phase, the FFM was mobilised on 5 April 2017 (as detailed in S/1497/2017 and S/1510/2017) with regard to the use of a chemical weapon in Khan Shaykhun on 4 April 2017. Whilst the team concentrated on this incident, additional information also became available in relation to other allegations, including those on 25 and 30 March 2017 in Ltamenah.

4.5 The FFM noted that during an investigation, complete, direct, and immediate access to the alleged site of the allegation provides the greatest opportunity to collect probative evidence. As in all the allegations and incidents referenced in S/1318/2015 (including Rev.1 and Rev.1/Add.1), S/1319/2015, S/1320/2015, S/1444/2016, S/1491/2017, and S/1510/2017, various constraints, in particular security concerns, have not enabled immediate access to sites by the FFM.

4.6 Given the relevance of immediate access to the site and that such access could not have been granted, the FFM determined the principal methods for collecting and evaluating the credibility of information to include the following: research into incidents and existing reports; assessment and corroboration of background information; conduct of interviews with relevant medical care providers, alleged casualties, and other individuals linked to the reported incident; review of documentation and records provided by interviewees; assessment of the symptoms of victims as reported by interviewees; and collection of biomedical specimens, and environmental samples, including metallic fragments, for subsequent analysis.

4.7 Through liaison with representatives of several NGOs, including Same Justice/Chemical Violations Documentation Centre Syria (CVDCS), the Syrian Civil Defence (also known as White Helmets (SCD)), the Syrian American Medical Society (SAMS), and the Syrian Institute for Justice (SIJ), the FFM identified several witnesses to be interviewed. These witnesses were expected to provide testimony and potentially relevant evidence.

4.8 Similarly, the evidentiary value of samples taken close to the time of the allegation, supported by photographic and video evidence and in association with witness testimony, was balanced

against the evidentiary value of the FFM visiting the site, if accessible sometime later, to collect its own samples.

Deployment activities

4.9 The FFM held its first interview, with respect to allegations in the Ltamenah area, on 10 April 2017. Throughout the interviews, including those relating to Khan Shaykhun, additional allegations were raised by the interviewees. These included on 24 March (in Ltamenah, Khattab and Qomhane) and on 3 April (in Hobait and Al-Tamanah); all in 2017. Other additional witnesses were also identified by other interviewees during the interview process.

4.10 Soil samples relating to the allegation of 30 March 2017 were received by the FFM team on 12 April 2017. Based on the witness testimony and evidence supplied during interviews, the FFM identified potentially relevant munition parts and arranged for their collection. As a result, further environmental samples, including remnants of alleged munition parts, were received by the FFM team on 17 July and 17 August 2017. Samples were not analysed immediately, due to the priority placed on analysing samples relating to Khan Shaykhun.

4.11 Information related to the samples is detailed both in Section 5 and Annex 4 of this report. At the time of handover, an NGO informed the team that the samples, received on 12 April, 17 July, and 17 August 2017, were taken by them. Representatives of the NGO were also interviewed and provided photographs and videos from the scene of the alleged incident, including the sampling process.

4.12 Hair and blood samples were taken, in the presence of the FFM, from two interviewees on 29 July 2017. The FFM took immediate custody of these samples, which relate to the allegation of 30 March 2017.

4.13 From the moment of their receipt by the team, all samples were handled in accordance with OPCW procedures, as applicable, including the application of seals by the FFM team. To date, the samples relating to 30 March 2017 have been analysed by two designated laboratories (DLs). The results are shown in Section 5 below.

5. INCIDENT SUMMARY AND ANALYSIS

5.1 This report covers only the allegation in Ltamenah on 30 March 2017. The other allegations, indicated in the previous section, may be covered at a later date.

5.2 The narratives are derived solely from interviews and, where possible, corroborated with different interviewees.

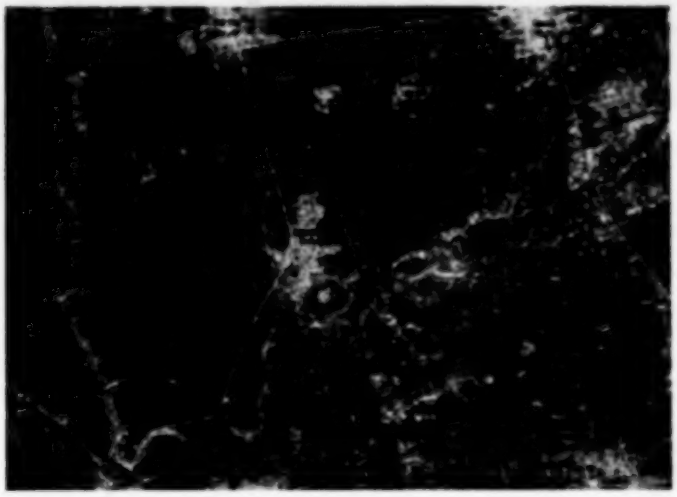
5.3 Facilities that provide medical treatment have, for reporting purposes, been generically referred to as medical facilities. These include established major hospitals, smaller specialist hospitals, field hospitals, and basic medical centres that offer little more than first aid.

5.4 Due to concerns raised by some of the witnesses, medical facilities—aside from those mentioned specifically herein—are not individually identified in this report. For ease of reporting, they have been assigned individual codes.

5.5 The following figures give the relative location of all towns/villages included in this report.

FIGURE 1: LTAMENAH AND ITS LOCATION WITHIN NORTHERN SYRIA

FIGURE 2: LTAMENAH AND THE SURROUNDING AREA



Ltamenah

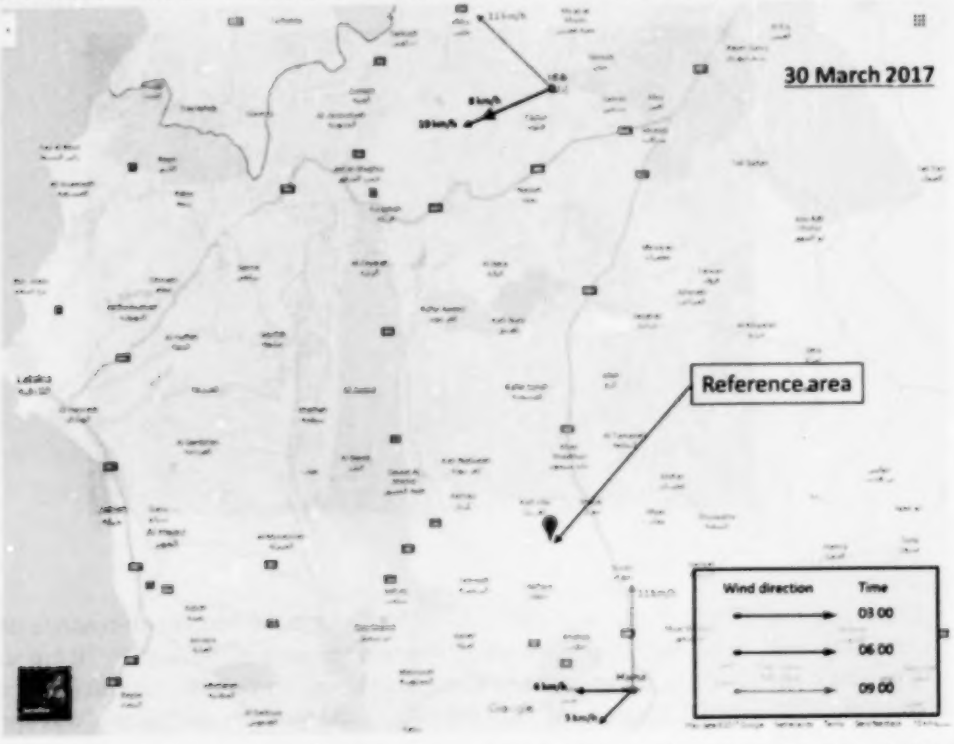
5.6 Ltamenah is a village in the district of Mahardah, within the Hama Governorate of the Syrian Arab Republic. It is located approximately 40 km northwest of Hama City, 70 km south of Idlib City and roughly 15 km to the south of Khan Shaykhun. Prior to the conflict (based on figures from the 2004 census), the population of the village and the surrounding area was approximately 16,000.

5.7 In March 2017, at the time of the allegations, the town was not under government control.

5.8 No open source meteorological data was available specifically for Ltamenah on 30 March 2017. As in previous missions, the FFM retrieved online retrospective meteorological data from nearby locations, in this case from Hama City and Idlib City. Additionally, the FFM researched the topography of the area.

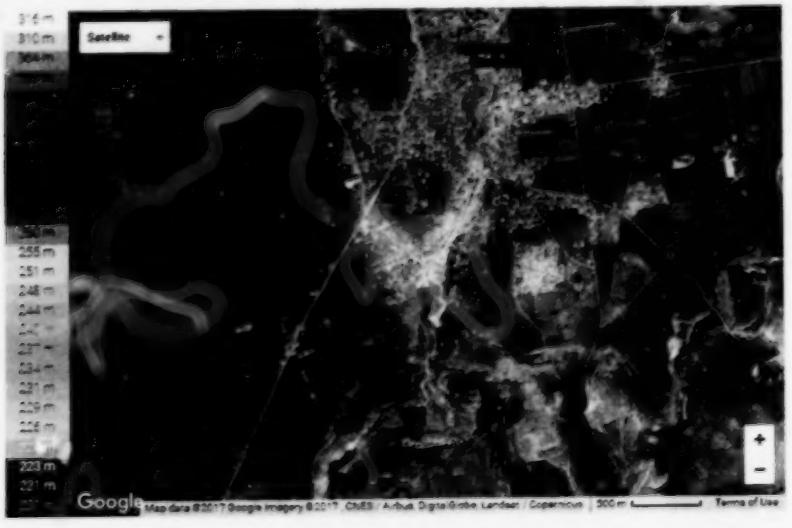
5.9 The following figure indicates wind speed and direction from http://www.ogimet.com/ and https://de.worldweatheronline.com. However, the FFM also notes that the topography of the area lends itself to the potential for local weather conditions differing from the prevailing conditions.

FIGURE 3: OPEN-SOURCE WEATHER INFORMATION, 30 MARCH 2017.



5.10 Software from http://en-ca.topographic-map.com was used in conjunction with Google Maps to produce the topography of Ltamenah and the surrounding area, as shown in figure 4 below.

FIGURE 4: TOPOGRAPHY OF LTAMENAH AND THE SURROUNDING AREA.



30 March 2017

5.11 Between 28 July and 15 October 2017, inclusive, the FFM interviewed 10 people in person, including doctors and patients. All interviewees were male.

TABLE 1: INTERVIEWEE DETAILS

	Interviewee	Male	Female	Primary casualty	Secondary casualty
Treating physicians	1	1	0	0	1
Medical support staff	3	3	0	0	0
Witness	3	3	0	2	0
Sampler	3	3	0	0	0
Total	**10**	**10**	**0**	**2**	**1**

30 March 2017 - Narrative

5.12 On 30 March 2017 at approximately 06:00, witnesses reported, roughly 500 metres from the town of Ltamenah in the southern outskirts, the sound of a jet aeroplane followed by the sounds from four air delivered munitions.

5.13 Witnesses describe being in nearby caves at the time of the passing plane and subsequent detonations. None of the witnesses interviewed saw the planes drop munitions in their area.

5.14 The third detonation had a different, quieter, characteristic than the other three, with no odour and associated smoke being unlike other attacks. At the time of the incident this location was near the confrontation lines.

5.15 Witnesses describe that upon exiting caves, people were shouting and "falling down". Casualties were shaking, shivering, foaming and becoming increasingly unresponsive. Attempts were made to rescue and evacuate casualties by witnesses and by others. Witnesses describe how rescuers also started falling down, before they also lost consciousness. The witnesses estimate the time between exposure and loss of consciousness as ranging from approximately 5 minutes in one case to around 30 minutes in another.

5.16 The witnesses who fell unconscious awoke in hospital and remained there for approximately 3 days. They describe symptoms such as "fire from head to toe", "unable to move", visual disturbances, insomnia, dizziness and anxiety, with some symptoms persisting for up to 20 days after the allegation.

5.17 Witnesses give limited information on the weather, save the temperatures were typical for that time of year and wind speed was low.

30 March 2017 – Epidemiological analysis

5.18 The team interviewed one doctor who worked at Medical Facility A (MF-A), which is a nearby hospital located in Syria. The following is a summary of his testimony.

5.19 At approximately 06:00 hrs, the doctor, who was sleeping in accommodation at MF-A, was woken by rescuers bringing a large number of casualties to the facility.

5.20 Due to decreased capacity to treat patients further to the incident of 25 March 2017, the majority of cases were immediately transferred to other hospitals before any treatment or detailed evaluation took place.

5.21 Cursory observation of casualties (both admitted and transferred) by subject is described as presenting with a toxidrome consistent with acetylcholinesterase inhibition. No blast or penetrating trauma was reported.

5.22 During patient contact the doctor removed some items of personal protective equipment (including gloves) and describes a persistent numbness in hands and feet, which was treated with anticonvulsant medication (gabapentin).

5.23 Casualties were transferred to other hospitals in the wider area, with approximately 65 being transferred to MF-C, approximately 40 to MF-D and 40-50 to MF-E. Sixteen casualties (all male) remained at MF-A for treatment, prior to transfer to other medical facilities within one hour. The signs and symptoms, including the severity of symptoms on presentation and subsequent treatment administered to these 16 casualties, are depicted in the following figures.

FIGURE 5: SEVERITY OF SYMPTOMS OF CASUALTIES ON PRESENTATION AT MF-A

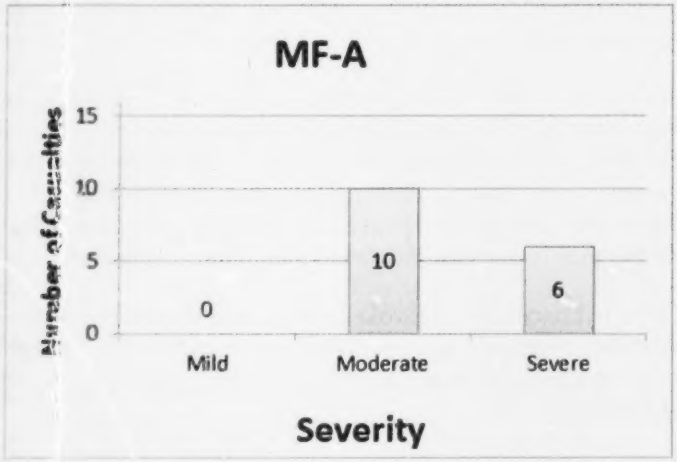


FIGURE 6: SIGNS AND SYMPTOMS OF CASUALTIES ON PRESENTATION AT MF-A

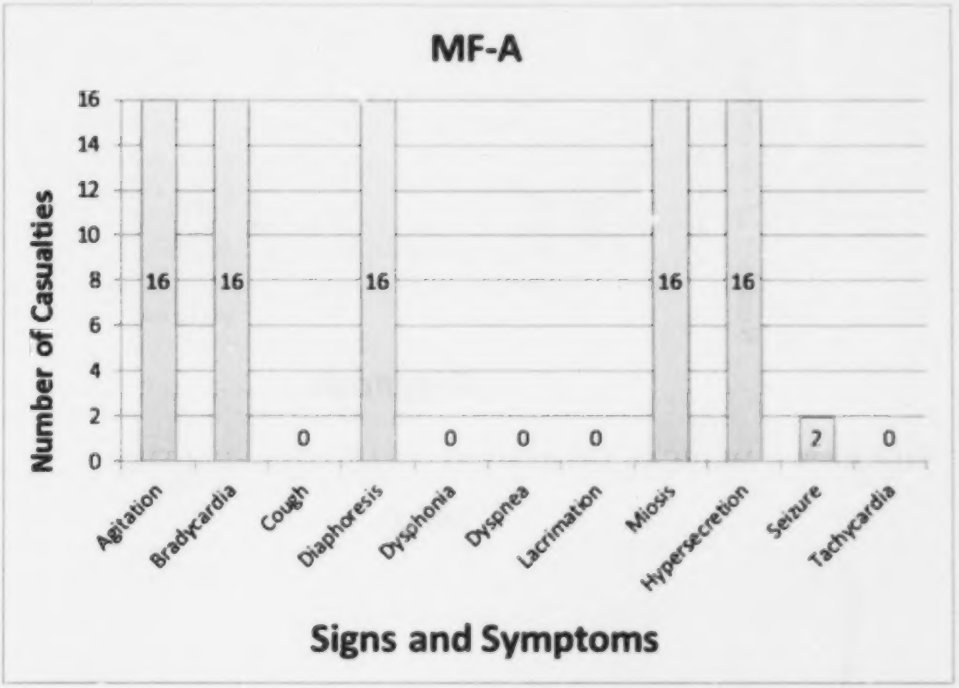
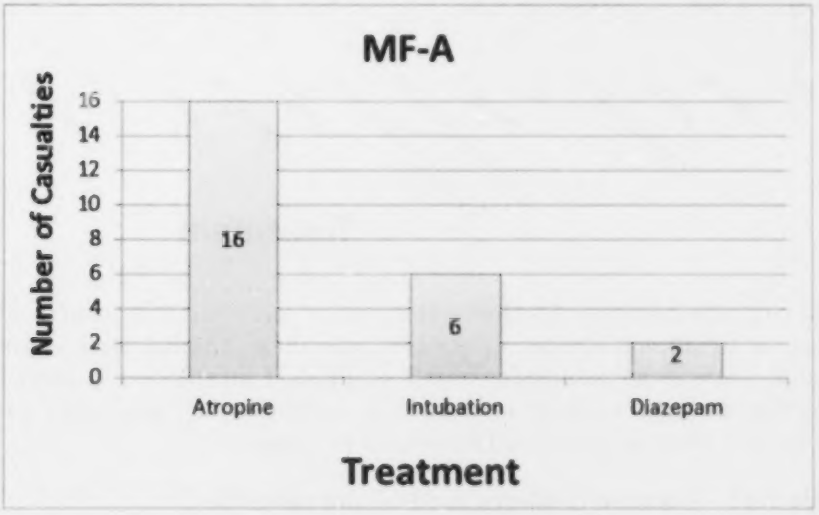


FIGURE 7: MEDICAL TREATMENT GIVEN TO CASUALTIES



5.24 The FFM also retrieved hospital records from MF-B in relation to seven casualties that were transferred to this facility. The initial diagnoses are shown in the following figure.

FIGURE 8: INITIAL DIAGNOSIS ON PRESENTATION

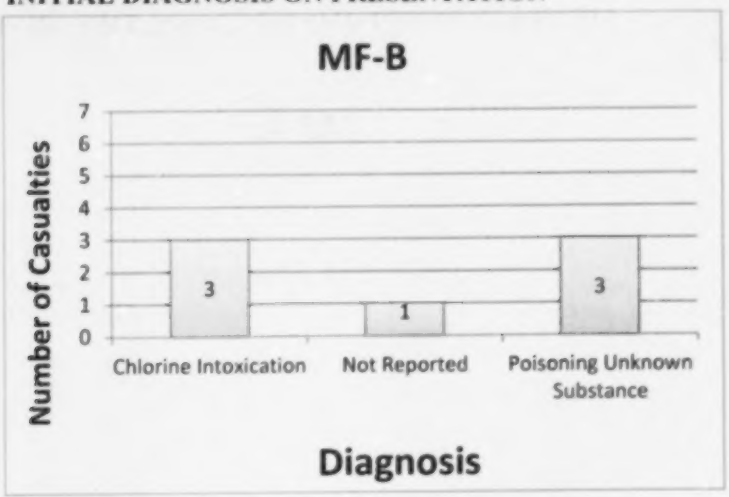
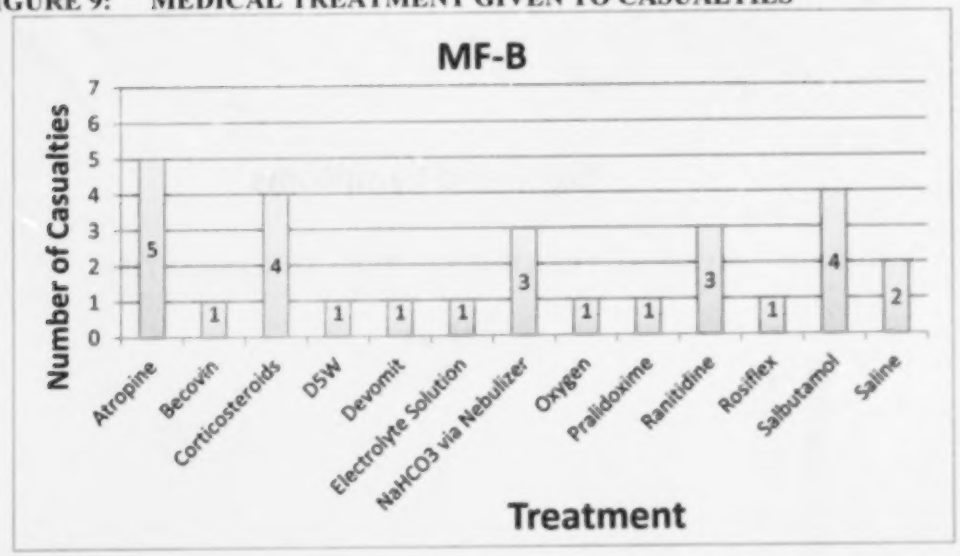


FIGURE 9: MEDICAL TREATMENT GIVEN TO CASUALTIES

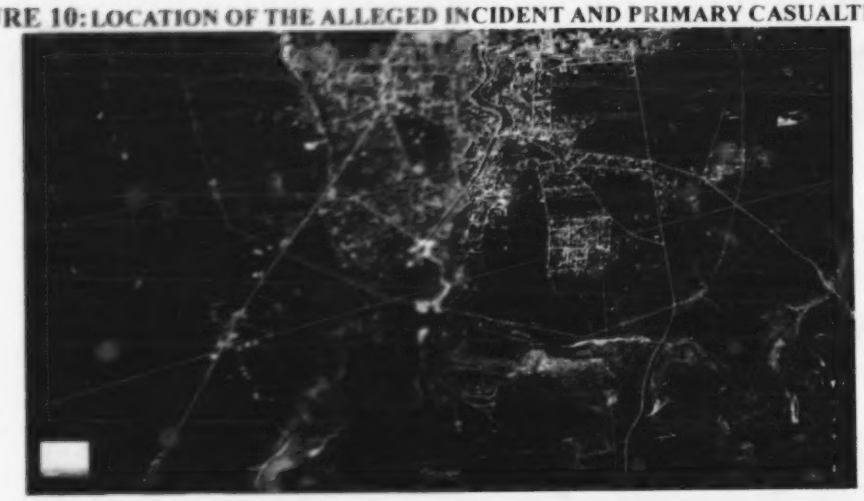


5.25 The FFM noted the diagnosis of "chlorine intoxication" and was informed, in several interviews, that when a significant number of patients present at hospital with apparent chemical intoxication, there is an assumption that the chemical intoxication is related to chlorine. Although after further assessment a more detailed prognosis may specifically rule out chlorine intoxication, the initial prognosis still remains on the records.

30 March 2017 – Location of alleged incident and casualties

5.26 The location of the allegation was a military area co-located with arable farming. It was predominantly occupied by combatants of an armed opposition group (AOG). A small number of agricultural workers were also present in the area at the time.

FIGURE 10: LOCATION OF THE ALLEGED INCIDENT AND PRIMARY CASUALTIES



5.27 According to the statements of the witnesses, all primary casualties were located in caves in close proximity of the location of the alleged incident. Interviewed medical personnel also reported secondary contamination.

5.28 The impact point, relating to the third detonation was estimated by witnesses to be 1-1.5 m in diameter and approximately 25 cm in depth. Vegetation appeared burnt and faded for about 20-30 metres and was noted as different to the vegetative damage typically associated with chlorine.

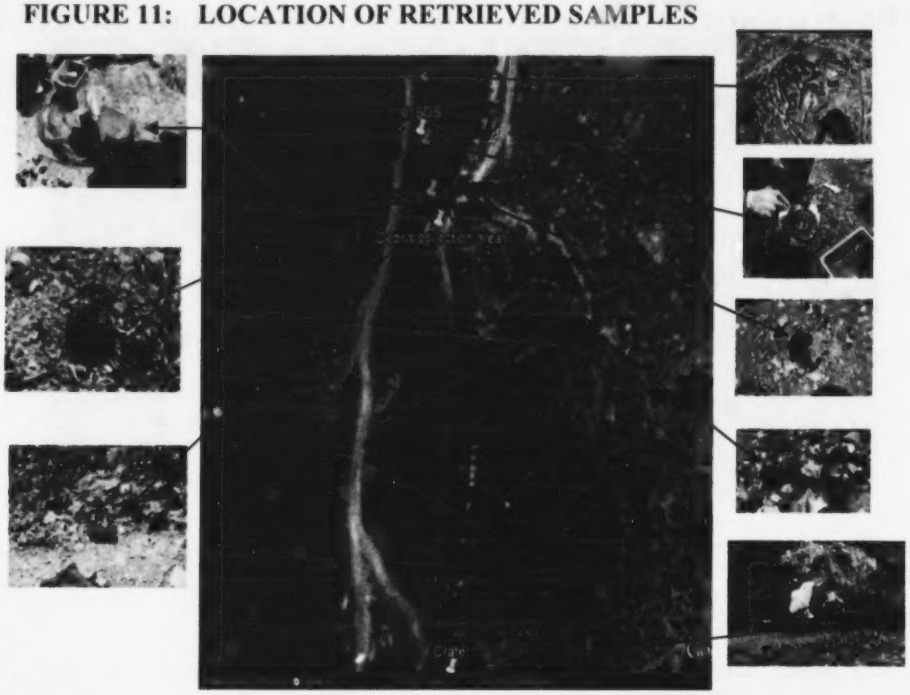
30 March 2017 – Environmental samples

5.29 Soil samples and metal parts were received by the FFM team on 12 April 2017, 17 July, and 17 August 2017.

5.30 At the time of handover, the team was informed that all samples were taken by the chemical sample unit of the SCD. A member of the chemical sample unit who took the samples was present at the handover and provided information on every sample. This information was supported by interviewing the same person and by photographs handed over at interview. The information was corroborated by interviewing two additional members of the chemical sample unit of the SCD.

5.31 The following figure shows the locations from where samples were retrieved.

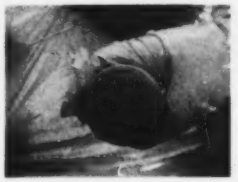
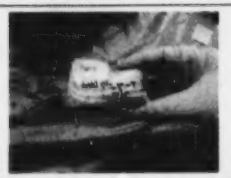
FIGURE 11: LOCATION OF RETRIEVED SAMPLES

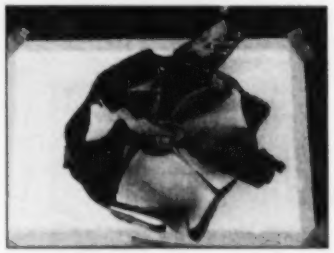


5.32 Photographs, with a description of each metal part, are given in Annex 4.

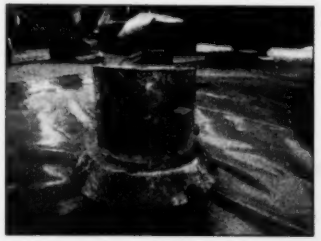
5.33 Samples were split at the OPCW Laboratory before being transported to DLs. The following table gives the analytical results from each sample. Note that three differing solvents, acetonitrile (ACN), dichloromethane (DCM), and water (H_2O) were used for extraction of metal parts.

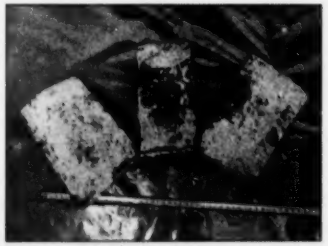
TABLE 2: SAMPLES AND ANALYTICAL RESULTS FROM DESIGNATED LABORATORIES

No	Sample Code	Description	Date of Receipt	Image	Analysis results	
					DL #1	DL #2
1	02SLS	Soil collected under metal piece	17/7/17		n.d.	n.d.
2	03SLS	Soil collected under metal piece	17/7/17		Sarin, DIMP, IMPA, MPA, HFP, DIPP, hexamine	DIMP, IMPA, HFP, DIPP, hexamine
3	04SLS	Soil collected under metal piece	17/7/17		DIMP, IMPA, MPA, HFP, DIPP, hexamine	DIMP, IMPA, MPA, HFP, DIPP, TPP
4	05SLS	Soil collected under metal piece	17/7/17		DIMP, IMPA, MPA, HFP, DIPP	DIMP, IMPA, MPA, DIPP, TPP
5	06SLS	Soil collected under metal piece	17/7/17		Sarin, DIMP, IMPA, MPA, HFP, DIPF, DIPP, hexamine	DIMP, IMPA, HFP, DIPP, hexamine, iPPF, DBP, TPP

No	Sample Code	Description	Date of Receipt	Image	Analysis results	
					DL #1	DL #2
6	01SDSDCM	Large metal piece	17/7/17		DIMP, IMPA, MPA, HFP, DIPP, TPP, (DIPF), hexamine	DIMP, IMPA, MPA, HFP, DIPF, TBP, TPP, hexamine
7	01SDSACN				Sarin, DIMP, HFP, DIPP, TPP, hexamine	DIMP, IMPA, MPA, HFP, DIPF, TBP, hexamine
8	01SDSH2O				DIMP, IMPA, MPA, HFP, DIPP, hexamine	DIMP, IMPA, MPA, HFP, DIPF, TBP, hexamine
9	01SDSDCM(B)	Metal piece	18/7/17		Sarin, DIMP, IMPA, MPA, HFP, TPP, DIPF, hexamine, caprolactam	Sarin, DIMP, IMPA, MPA, MPFA, HFP, TBP, TPP, DIPF, DIPP, iPPF
10	01SDSACN(B)				Sarin, DIMP, HFP, DIPF, hexamine, caprolactam	Sarin, DIMP, IMPA, MPA, MPFA, HFP, TBP, TPP, DIPF, DIPP, iPPF
11	01SDSH2O(B)				DIMP, IMPA, MPA, HFP, hexamine, caprolactam	Sarin, DIMP, IMPA, MPA, MPFA, HFP, TBP, TPP, DIPF, DIPP, iPPF
12	02SDSDCM(B)	Metal piece	18/7/17		IMPA, HFP	IMPA, HFP, TBP
13	02SDSACN(B)				HFP	IMPA, HFP, TBP
14	02SDSH2O(B)				IMPA, MPA, HFP	IMPA, HFP, TBP

No	Sample Code	Description	Date of Receipt	Image	Analysis results	
					DL #1	DL #2
15	03SDSDCM(B)	Metal piece	18/7/17		Sarin, DIMP, IMPA, MPA, HFP, DIPF	Sarin, DIMP, IMPA, MPA, HFP, DIPF, TBP
16	03SDSACN(B)				Sarin, DIMP, HFP, DIPF, hexamine	Sarin, DIMP, IMPA, MPA, HFP, DIPF, TBP
17	03SDSH2O(B)				DIMP, IMPA, MPA, HFP, hexamine	Sarin, DIMP, IMPA, MPA, HFP, DIPF, TBP
18	04SDSDCM(B)	Metal piece	18/7/17		Sarin, DIMP, IMPA, MPA, MPFA, HFP, TPP, DIPF	Sarin, DIMP, IMPA, MPA, MPFA, HFP, DIPF, DIPP, TPP, iPPF, 5-ethyl-1,3-dioxane-5-methanol
19	04SDSACN(B)				Sarin, DIMP, IMPA, MPA, HFP, TPP, DIPF, hexamine	Sarin, DIMP, IMPA, MPA, MPFA, HFP, DIPF, DIPP, TPP, iPPF, 5-ethyl-1,3-dioxane-5-methanol
20	04SDSH2O(B)				DIMP, IMPA, MPA, HFP, DIPP, hexamine	Sarin, DIMP, IMPA, MPA, MPFA, HFP, DIPF, DIPP, TPP, iPPF, 5-ethyl-1,3-dioxane-5-methanol

No	Sample Code	Description	Date of Receipt	Image	Analysis results	
					DL #1	DL #2
21	07SDSDCM	Metal piece	17/7/17		Sarin, DIMP, IMPA, MPA, HFP, TPP, DIPF	Sarin, DIMP, IMPA, MPA, HFP, DIPF
22	07SDSACN				Sarin, DIMP, HFP, DIPF, hexamine	Sarin, DIMP, IMPA, MPA, HFP, DIPF
23	07SDSH2O				DIMP, IMPA, MPA, HFP, DIPP, hexamine	Sarin, DIMP, IMPA, MPA, HFP, DIPF
24	08SDSDCM	Metal piece	17/7/17		Sarin, DIMP, IMPA, MPA, Pyro, HFP, DIPP, TPP, DIPF, hexamine	Sarin, DIMP, IMPA, MPA, Pyro, HFP, DIPP, MPFA, iPPF, DBP, hexamine
25	08SDSACN				Sarin, DIMP, IMPA, MPA, HFP, DIPP, TPP, hexamine	Sarin, DIMP, IMPA, MPA, Pyro, HFP, DIPP, MPFA, iPPF, DBP, hexamine
26	08SDSH2O				DIMP, IMPA, MPA, HFP, DIPP, hexamine	Sarin, DIMP, IMPA, MPA, Pyro, HFP, DIPP, MPFA, iPPF, DBP, hexamine
27	08SDSRUB				DIMP, IMPA, MPA, HFP, DIPF, DIPP, hexamine	Sarin, DIMP, IMPA, MPA, MPFA, Pyro, hexamine
28	09SDSDCM	Metal piece	17/7/17		DIMP, IMPA, HFP, hexamine	DIMP, IMPA, MPA, HFP, hexamine
29	09SDSACN				Sarin, DIMP, IMPA, HFP, Hexamine	DIMP, IMPA, MPA, HFP, hexamine
30	09SDSH2O				IMPA, MPA, HFP, hexamine	DIMP, IMPA, MPA, HFP, hexamine

No	Sample Code	Description	Date of Receipt	Image	Analysis results DL #1	Analysis results DL #2
31	10SDSDCM	Four metal pieces	17/7/17		HFP, TNT	DIMP, IMPA
32	10SDSACN				HFP, TNT	DIMP, IMPA
33	10SDSH2O				HFP	DIMP, IMPA
34	11SDSDCM	Metal piece	17/7/17		DIMP, IMPA, MPA, HFP, DIPF, hexamine, caprolactam	Sarin, DIMP, IMPA, MPA, HFP, DIPF, iPPF
35	11SDSACN				Sarin, DIMP, HFP, DIPF, caprolactam	Sarin, DIMP, IMPA, MPA, HFP, DIPF, iPPF
36	11SDSH2O				DIMP, IMPA, MPA, HFP, hexamine, caprolactam	Sarin, DIMP, IMPA, MPA, HFP, DIPF, iPPF

No	Sample Code	Description	Date of Receipt	Image	Analysis results	
					DL #1	DL #2
37	12SDSDCM	Metal piece	17/7/17		DIMP, HFP	DIMP, IMPA, MPA, HFP
38	12SDSACN				DIMP, HFP	DIMP, IMPA, MPA, HFP
39	12SDSH2O				DIMP, IMPA, MPA, HFP	DIMP, IMPA, MPA, HFP
40	31SLS	Gravel, 50m away	12/4/17		IMPA, DIMP	Sarin, IMPA, MPA, DIMP
41	32SLS	Gravel from crater	12/4/17		IMPA, DIMP	Sarin, IMPA, MPA, DIMP

No	Sample Code	Description	Date of Receipt	Image	Analysis results DL #1	Analysis results DL #2
42	33SLS	Gravel	12/4/17		IMPA, DIMP	Sarin, IMPA, MPA, DIMP
43	34SDS	Plastic bag + soil + vegetation	12/4/17		IMPA, DIMP	IMPA, MPA, DIMP
44	35SLS	Soil	12/4/17		DIMP	IMPA, MPA, DIMP

Key	
ACN	Solvent - Acetonitrile
DBP	Dibutyl phosphate
DCM	Solvent - Dichloromethane
DIMP	Di-isopropyl methylphosphonate (by-product of sarin production)
DIPF	Di-isopropyl phosphorofluoridate (by-product of sarin precursor/sarin production)
DIPP	Diisopropyl phosphate
DL	Designated laboratory
Hexamine	Hexamethylentetramine
HFP	Hexafluorophosphate
H2O	Solvent - Water
IMPA	Isopropyl methylphosphonate (first degradation product of sarin)
iPPF	Isopropyl phosphorofluoridate
MPA	Methylphosphonic acid (degradation product of sarin and/or nerve agent precursor and/or nerve agent by-product)
MPFA	Methylphosphonofluoridic acid
n.d.	No detection of relevant chemicals (as defined by the OPCW laboratory)
Pyro	Di-isopropyl dimethylpyrophosphonate (by-product of sarin production)
Sarin	Isopropyl methylphosphonofluoridate
TBP	Tributyl phosphate
TNT	Trinitrotoluene
TPP	Tri-isopropyl phosphate (by-product of sarin precursor/sarin production)

Report of biomedical specimens

5.34 Table 3 summarises results from blood and hair specimens collected from two interviewees, in the presence of FFM team members, on 29 July 2017. These samples relate to the allegation of 30 March 2017.

5.35 The FFM acknowledged that biomedical samples taken more than three months after the allegation were very unlikely to test positive for exposure to organophosphorus chemicals, even if a person had been exposed. However, given the variability in results, depending on issues such as extent of exposure; an individual's metabolism; and testing techniques, including sensitivity of instrumentation; the FFM decided that although positive results would be unlikely, the potential for a positive result lent value to taking and testing the samples.

5.36 Biomedical specimens were analysed at two DLs. Results of the analyses from each laboratory were consistent with each other.

TABLE 3: BIOMEDICAL RESULTS FROM SPECIMENS, WHERE THE SAMPLING WAS WITNESSED BY THE FFM TEAM

No	Blood		Hair	
	Sample Reference	Analysis Results	Sample Reference	Analysis Results
1.	1399P	No organophosphorus based nerve agent biomarkers detected	1399H	No organophosphorus based nerve agent biomarkers detected
2.	1501P		1501H	

5.37 No biomarkers relating to exposure to an organophosphorus based nerve agent were detected in blood (plasma) specimens. Similarly, no biomarkers relating to exposure to an organophosphorus-based nerve agent were detected in hair specimens.

6. CONCLUSIONS

6.1 As in other FFM missions, the team was not able to visit a secured site immediately after the alleged incident. The potential for access was made more difficult as the area was predominantly a military area with ongoing conflict prior to the allegation through to the time this report was being drafted. The team therefore relied on: the testimony of interviewees; samples as made available by the interviewees; and limited hospital records.

6.2 Based partly on its long standing interactions with NGOs and based on initiating work on the allegation of 25 March 2017 in a different area of Ltamenah, the FFM was able to gather facts related to the allegation of 30 March 2017 in Ltamenah.

6.3 The FFM had limited access to associated medical records and was unable to visit hospitals that may have admitted patients. Additionally, it was only possible to take biomedical specimens from suspected exposed people after positive indicators would have most likely been metabolised. In this context, it is important to recognise that not being able to find biomarkers relating to exposure to organophosphate nerve agents may signify no exposure. Similarly, there are scientific reasons why these biomarkers may not be detected, principally due to the significant time lapse between potential exposure and collection, sample amount and limit of detection of the analytical methods.

6.4 Interviewees gave a consistent narrative of the incident, the reported medical signs and symptoms and the way samples were collected. The FFM was able to place witnesses at the site at the time and correlate their medical assessment. Based on these factors the FFM determined that at least 16 people displayed symptoms associated with exposure to an acetylcholinesterase inhibitor.

6.5 Through interviews and review of video evidence supplied at interview, the FFM was able to determine that environmental samples including munition parts were retrieved from the site of the allegation. Although the initial environmental samples were collected the day following the alleged incident, the munition parts, along with additional soil samples were collected on 5 July and 30 July 2017. Whilst the munition parts were retrieved sometime after the allegation, from interviews and through analysis of video evidence, the FFM ascertained that munition parts collected later were the same parts present at the site when the original environmental samples were collected.

6.6 The analyses confirm not only the presence of sarin on samples, including munition parts, but also the presence of other chemicals inter alia potential impurities and breakdown products related to sarin, specific to the production route, the raw materials and precursors used.

6.7 Whilst the munition parts could not be categorically attributed to the allegation of 30 March 2017, their presence at the location, their contamination with sarin and sarin related chemicals, and features consistent with a chemical munition all lend themselves to the likelihood of their being involved in the deployment of a chemical weapon.

6.8 The FFM noted the low wind speed on the day of the allegation which would facilitate the collection of sarin, being denser than air, in low areas such as underground in caves. However,

in this context, it is unclear whether exposure may have occurred inside or outside the nearby caves.

6.9 Given the limited number of witnesses and limited availability of supporting medical records, the FFM has not been able to determine with absolute certainty the use of a chemical weapon. Nevertheless, the FFM's analysis confirms the presence of sarin on samples which came from the site of the allegation; casualties from that site at the same time period displayed symptoms and received treatment consistent with exposure to sarin; and munition parts are consistent with application in a chemical weapon. Therefore, the FFM is able to conclude that sarin was more than likely used as a chemical weapon on 30 March 2017 in the south of Ltamenah.

Annexes (English only):

Annex 1: Reference Documentation
Annex 2: Open Sources
Annex 3: Evidence Obtained by the FFM
Annex 4: Photographs and Descriptions of Metal Parts

Annex 1

REFERENCE DOCUMENTATION

	Document Reference	Full title of Document
1.	QDOC/INS/SOP/IAU01 (Issue 1, Revision 1)	Standard Operating Procedure for Evidence Collection, Documentation, Chain-of-Custody and Preservation during an Investigation of Alleged Use of Chemical Weapons
2.	QDOC/INS/WI/IAU05 (Issue 1, Revision 2)	Work Instruction for Conducting Interviews during an Investigation of Alleged Use
3.	QDOC/INS/SOP/IAU02 (Issue 1, Revision 0)	Standard Operating Procedure Investigation of Alleged Use (IAU) Operations
4.	QDOC/INS/SOP/GG011 (Issue 1, Revision 0)	Standard Operating Procedure for Managing Inspection Laptops and other Confidentiality Support Materials
5.	QDOC/LAB/SOP/OSA2 (Issue 1, Revision 2)	Standard Operating Procedure for Off-Site Analysis of Authentic Samples
6.	QDOC/LAB/WI/CS01 (Issue 1, Revision 2)	Work Instruction for Handling of Authentic Samples from Inspection Sites and Packing Off-Site Samples at the OPCW Laboratory
7.	QDOC/LAB/WI/OSA3 (Issue 2, Revision 1)	The chain of custody and documentation for OPCW samples on-site
8.	QDOC/LAB/WI/OSA4 (Issue 1, Revision 3)	Work Instruction for Packing of Off-Site Samples
9.	S/1402/2016	Status of the Laboratories Designated for the Analysis of Authentic Biomedical Samples
10.	C-20/DEC.5	Designation of Laboratories for the Analysis of Authentic Biomedical Samples and Guidelines for the Conduct of Biomedical Proficiency Tests

Annex 2

OPEN SOURCES

Open source internet links related to the Al Ltamenah allegation of 30 March 2017
• http://acloserlookonsyria.shoutwiki.com/wiki/Alleged_Chemical_Attacks,_March_25-April_3,_2017 • https://documents-dds-ny.un.org/doc/UNDOC/GEN/172/341/8X/PDF/1723418.pdf?OpenElement • http://reliefweb.int/report/syrian-arab-republic/another-chemical-weapon-attack-hama-week • http://reliefweb.int/report/syrian-arab-republic/breaking-chemical-weapons-attack-latamneh-hama-injures-70 • http://smartnews-agency.com/ar/breakingNews/225031/%D8%A5%D8%B5%D8%A7%D8%A8%D8%A7%D8%AA-%D9%81%D9%8A-%D8%B5%D9%81%D9%88%D9%81-%D8%A7%D9%84%D9%85%D8%AF%D9%86%D9%8A%D9%8A%D9%86-%D8%AC%D8%B1%D8%A7%D8%A1-%D9%82%D8%B5%D9%81-%D8%AC%D9%88%D9%8A-%D8%A8%D9%85%D9%88%D8%A7%D8%AF-%D8%B3%D8%A7%D9%85%D8%A9-%D8%B9%D9%84%D9%89?soicalmedia=pg&utm_source=dlvr.it&utm_medium=twitter • http://smartnews-agency.com/ar/breakingNews/225031/%D8%A5%D8%B5%D8%A7%D8%A8%D8%A7%D8%AA-%D9%81%D9%8A-%D8%B5%D9%81%D9%88%D9%81-%D8%A7%D9%84%D9%85%D8%AF%D9%86%D9%8A%D9%8A%D9%86-%D8%AC%D8%B1%D8%A7%D8%A1-%D9%82%D8%B5%D9%81-%D8%AC%D9%88%D9%8A-%D8%A8%D9%85%D9%258 • http://www.bbc.com/news/live/world-middle-east-39432753?ns_mchannel=social&ns_source=twitter&ns_campaign=bbc_live&ns_linkname=58dcc639e4b0377a1393acfe%26%27Chemical%20attack%27%26&ns_fee=0#post_58dcc639e4b0377a1393acfe • http://www.ohchr.org/EN/HRBodies/HRC/RegularSessions/Session36/Pages/ListReports.aspx • https://smartnews-agency.com/ar/wires/225033/%D8%B9%D8%B4%D8%B1%D8%A7%D8%AA-%D8%A7%D9%84%D8%A5%D8%B5%D8%A7%D8%A8%D8%A7%D8%AA-%D8%A8%D8%BA%D8%A7%D8%B2%D8%A7%D8%AA-%D8%B3%D8%A7%D9%85%D8%A9-%D8%A3%D8%B7%D9%84%D9%82%D8%AA%D9%87%D8%A7-%D8%B7%D8%A7%D8%A6%D8%B1%D8%A7%D8%AA-%D8%A7%D9%84%D9%86%D8%B8%D8%A7%D9%85-%D8%B9%D9%84%D9%89-%D9%85%D8%AF%D9%8A%D9%86%D8%A9-%D8%A7%D9%84%D9%84%D8%B7%D8%A7%D9%85%D9%86%D8%A9?utm_source=dlvr.it&utm_medium=twitter&utm_campaign=smartnewsagency • https://smartnews-agency.com/ar/wires/225033/%D8%B9%D8%B4%D8%B1%D8%A7%D8%AA-%D8%A7%D9%84%D8%A5%D8%B5%D8%A7%D8%A8%D8%A7%D8%AA-%D8%A8%D8%BA%D8%A7%D8%B2%D8%A7%D8%AA-

Open source internet links related to the Al Ltamenah allegation of 30 March 2017
%D8%B3%D8%A7%D9%85%D8%A9- %D8%A3%D8%B7%D9%84%D9%82%D8%AA%D9%87%D8%A7- %D8%B7%D8%A7%D8%A6%D8%B1%25
• https://twitter.com/AleppoAMCen/status/847380687669698560
• https://twitter.com/freelaancenews/status/847368796603953152
• https://twitter.com/ruswarcrimes/status/847346171676721152
• https://twitter.com/SMARTNewsAgency/status/847355499888615424
• https://twitter.com/SPRINGNOWTIME/status/847329750678777856
• https://twitter.com/Step_Agency/status/847356073572876288
• https://twitter.com/Tania_Tania_C/status/847357789294911488
• https://www.youtube.com/watch?v=4ffxy9G-SrQ&t=231s
• https://www.youtube.com/watch?v=pq_Ne3CnkKA
• https://www.youtube.com/watch?v=q2b3oQbniUs&t=89s

Annex 3

1. EVIDENCE OBTAINED BY THE FFM

The tables below summarise the list of evidence collected from various sources by the FFM. Table A3.1 lists electronic media storage devices such as USB sticks and micro SD cards, hard copy evidence and samples. Electronic files include audio-visual captions, still images and documents and are specifically listed in Table A3.2. Hardcopy files consist of various documents, including drawings made by witnesses, medical records, and other patients' information. Table A3.1 also shows the list of samples collected from various sources including biological samples, comprising blood and hair from casualties; environmental samples, including gravel and soil, and other samples, including metal pieces and fragments.

TABLE A3.1 PHYSICAL EVIDENCE COLLECTED BY THE TEAM

Entry Number	Evidence description	Evidence reference number	Evidence source
	Electronic and hard copy files and documents		
1.	Kingston 16GB SD Card and 32 32GB µSD Card - Video recordings	20170728139201	Handed over by 1392
2.	Kingston 32GB µSD Card - Audio recording	20170728139202	Handed over by 1392
3.	Kingston 16GB SD Card - 2 pdf files	20170728139203	Handed over by 1392
4.	Drawing – 1 page	20170728139204	Handed over by 1392
5.	Kingston 16GB SD Card - Video recording	20170810139501	Handed over by 1395
6.	Kingston 4GB µSD Card - Audio recording	20170810139502	Handed over by 1395
7.	Kingston 16GB SD Card - Video recordings	20170812139601	Handed over by 1396
8.	Kingston 4GB µSD Card - Audio recording	20170812139602	Handed over by 1396
9.	Kingston 32GB µSD Card – 54 files	20170812139603	Handed over by 1396
10.	Drawing – 1 page	20170812139603	Handed over by 1396

Entry Number	Evidence description	Evidence reference number	Evidence source
11.	Kingston 16GB SD Card - Video recording	20170730139701	Handed over by 1397
12.	Kingston 32GB µSD Card - Audio recording	20170730139702	Handed over by 1397
13.	Kingston 16GB SD Card – 8 photos, 7 videos	20170730139703	Handed over by 1397
14.	Kingston 16GB SD Card - Video recording	20170729139901	Handed over by 1399
15.	Kingston 32GB µSD Card - Audio recording	20170729139902	Handed over by 1399
16.	Kingston 16GB SD Card – 1 video	20170729139903	Handed over by 1399
17.	Kingston 16GB SD Card - Video recording	20170729150101	Handed over by 1501
18.	Kingston 32GB µSD Card - Audio recording	20170729150102	Handed over by 1501
19.	Kingston 16GB SD Card - Video recording	20170810151101	Handed over by 1511
20.	Kingston 4GB µSD Card - Audio recording	20170810151102	Handed over by 1511
21.	Kingston 32GB µSD Card - Video recording	20170812151301	Handed over by 1513
22.	Kingston 4GB µSD Card - Audio recording	20170812151302	Handed over by 1513
	Samples		
1	Gravel, 50m away	20170412135106	Syria Civil Defence
2	Gravel from crater	20170412135107	Syria Civil Defence
3	Gravel	20170412135108	Syria Civil Defence
4	Plastic bag + soil + vegetation	20170412135109	Syria Civil Defence
5	Soil	20170412135110	Syria Civil Defence
6	Large piece of a metal fragment.	20170717152001	Syria Civil Defence

Entry Number	Evidence description	Evidence reference number	Evidence source
7	Soil from under metal piece	20170717152002	Syria Civil Defence
8	Soil from under metal piece	20170717152003	Syria Civil Defence
9	Soil from under metal piece	20170717152004	Syria Civil Defence
10	Soil from under metal piece	20170717152005	Syria Civil Defence
11	Soil from under metal piece	20170717152006	Syria Civil Defence
12	Piece of metal fragment	20170717152007	Syria Civil Defence
13	Piece of metal fragment	20170717152008	Syria Civil Defence
14	Piece of metal fragment	20170717152009	Syria Civil Defence
15	Four (4) Pieces of metal fragments	20170717152010	Syria Civil Defence
16	Piece of metal fragment (three attached rectangles)	20170717152011	Syria Civil Defence
17	Metallic support type bar fragment	20170717152012	Syria Civil Defence
18	Tail part of munition	20170717152001	Syria Civil Defence
19	Triangular metal object	20170717152002	Syria Civil Defence
20	Cylindrical object with lifting lug attached	20170717152003	Syria Civil Defence
21	Metal object	20170717152004	Syria Civil Defence
22	Blood	20170729139904	Obtained from 1399
23	Blood	20170729150103	Obtained from1501
24	Hair	20170729139905	Obtained from1399
25	Hair	20170729150104	Obtained from1501

TABLE A3.2 ELECTRONIC EVIDENCE COLLECTED BY THE TEAM

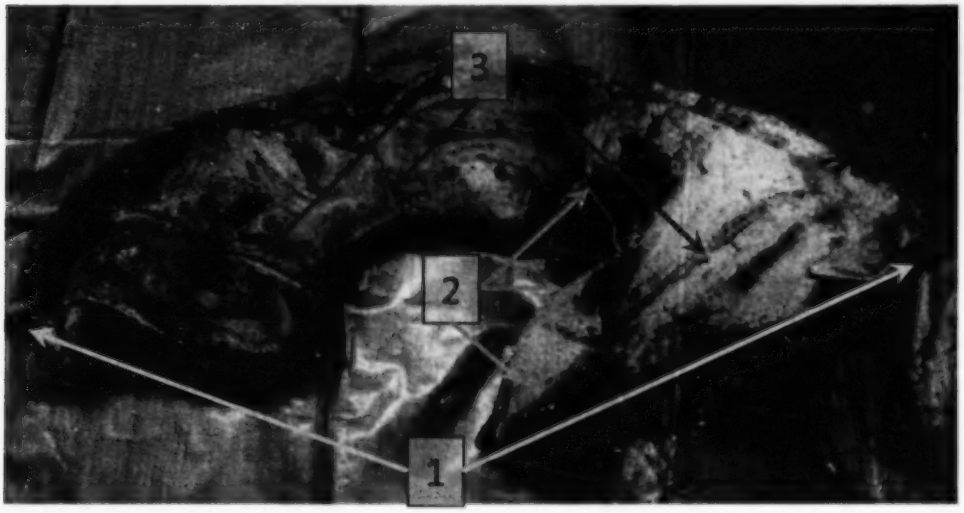
Interview Number	Folder Location	File Names			
1392	D:\1392\1392 Evidences	تقرير صادر عن مديرية صحة حماه حول استهداف مناطق في ريف حماه الشمالي بغازات سامة محرمة دولياً			
1396	D:\1396\1396 Evidence\Removable Disk	link on you			
	D:\1396\1396 Evidence\Removable Disk\ كيماوي مشفى اللطامنة صور +فيديوهات	أخبار عربية - إشتباه (5) باستخدام الكيمياوي ضد مستشفى اللطامنة في #حماة - YouTube	شهادة احد المصابين الذين كانو بالمشفى	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (14	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (27
		عشرات الإصابات (5) جراء قصف بالغازات السامة - على مدينة اللطامنة بحماة YouTube	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (1	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (15	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (28
		لحظة إلقاء الطيران (5) المروحي براميل غاز الكلور على مشفى اللطامنة - وخروجه عن الخدمة YouTube	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (2	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (16	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (29
		للمرة الثالثة على (5) التوالي طيران النظام يقصف بغاز الكلور بلدة اللطامنة YouTube - بريف حماة	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (3	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (17	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (30
		نافذة تفاعلية .. طائرات (5) النظام تستهدف مدينة اللطامنة بريف حماة بمواد YouTube(1) - كيميائية	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (4	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (18	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (31
		نظام الأسد يقصف (5) المدنيين بريف حماة بغاز كيماوي سام أعراضه شديدة و يعمل على ارتخاء YouTube - الأعصاب	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (5	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (19	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (32
		IMG-20170330-WA0112	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (6	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (20	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (33

Interview Number	Folder Location	File Names			
		IMG-20170330-WA0115	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (7	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (21	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (34
		IMG-20170330-WA0116	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (8	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (22	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (35
		VID-20170324-WA0053	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (9	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (23	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (36
		VID-20170324-WA0056	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (10	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (24	(كادر المشفى المصاب (1
		VID-20170330-WA0097	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (11	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (25	(كادر المشفى المصاب (2
		VID-20170330-WA0099	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (12	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (26	(كادر المشفى المصاب (3
		تقرير مشفى اللطامنة قصفه بغاز الكلور	صور لكادر المشفى والبراميل داخل المشفى التي (تحوي غاز الكلور (13		
1397	D:\1397\1397 Evidence	d010c646-9207-4862-b644-306c795e274b	IMG_0607	IMG_0611	IMG_6963
		IMG_0604	IMG_0608	IMG_6959	IMG_6971
		IMG_0605	IMG_0609	IMG_6960	MVI_0612
		IMG_0606	IMG_0610	IMG_6962	
1399	D:\1399\1399 Evidence	WhatsApp Video 2017-07-29 at 15.33.49			

Annex 4

PHOTOGRAPHS AND DESCRIPTIONS OF METAL PARTS

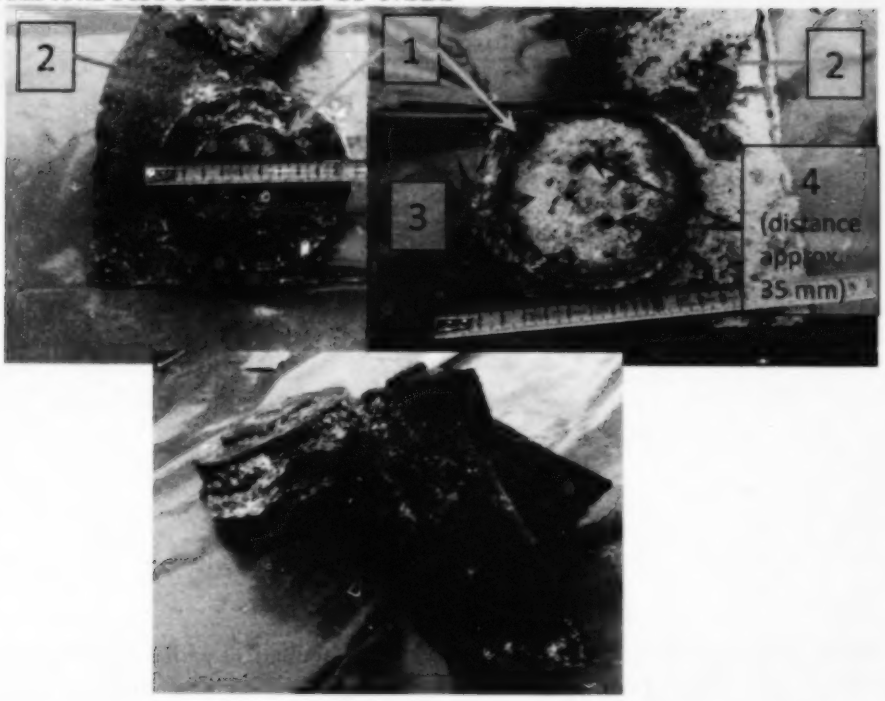
FIGURE A4.1 PHOTOGRAPH OF 01SDS



1. 01SDS (Large metal piece, see figure A4.1 above) is a large semi-circular metal piece. It is heavily deformed and corroded, particularly on what appears to be the inner side. On the item surface, traces of grey and dark green paint are still visible. The item is approximately 900 mm in length and 300 mm in width. The longer edge of the item has been reinforced (labelled 1). The thickness of the metal plate is approximately 5 mm.

2. A triangular metal part is attached to the main body of the item. This part resembles a tail attached side fin (labelled 2). The remains of three other welds (labelled 3) of similar length and approximately equidistant from each other can be seen. This may indicate the original presence of additional three equivalent objects.

FIGURE A4.2 PHOTOGRAPHS OF 07SDS

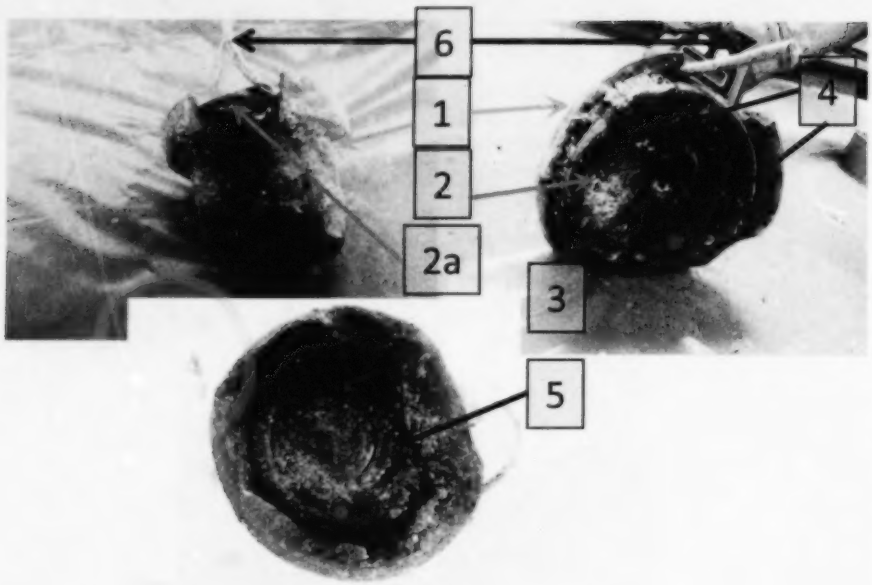


3. 07SDS consists of a circular object (labelled 1) attached to a metal plate (labelled 2). It is heavily corroded and the metal plate is bent and deformed. On what appears to be an outer side, dark green colour is partially visible. The circular object on the topside has a metal lid (labelled 3) with two holes (labelled 4), probably for a mount using a fork key. The distance between the two holes is approximately 35 mm.

4. On the other side, which appears to be the internal side of the system, three circles are visible (the innermost circle is not visible in the photograph). On this internal side (the side without visible colour markings), the respective diameters of the circles are approximately 105 mm, 60 mm and 50 mm.

5. The thickness of the circular object is approximately 35 mm. The metal plate to which it is attached is roughly 5 mm thick and is ruptured on all sides. One side has a very straight cut.

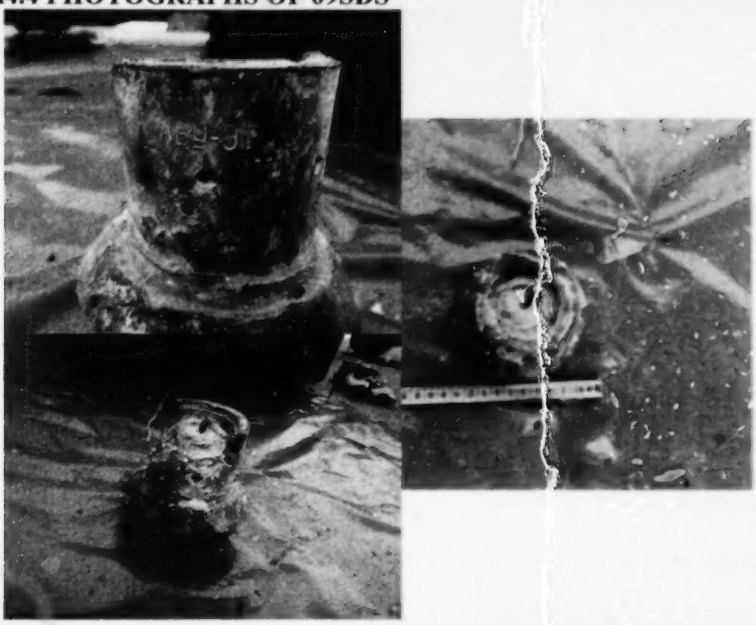
FIGURE A4.3 PHOTOGRAPHS OF 08SDS



6. 08SDS consists of larger cup-shaped outer part (labelled 1) with a diameter of approximately 120 mm and internal part screwed in as a lid (labelled 2) with a diameter of approximately 100 mm. It is metallic and heavily corroded. Aside from being deformed, the outer body is also fractured open, revealing part of the internal system and threads (labelled 2a). The lid part has a larger hole in the middle where a segment of a protruding metal rod (labelled 3) is visible. The metal rod is broken and deformed.

7. There are also two smaller holes (labelled 4) on the lid part, probably used to assemble the system using a fork key (distance between holes is approximately 60 mm). On the one end, the object is partially hollow. Part of the inner mechanism can be seen (labelled 5). What appears to be a rubber seal (labelled 6) is also visible on the splintered side of the item.

FIGURE A4.4 PHOTOGRAPHS OF 09SDS



8. 09SDS is a heavily deformed and damaged metal object. On the both sides threads are visible. This part also bears visible markings which point to a universal bomb fuse. The fuse has been activated and does not contain explosive material. This device is normally electrically armed, heat resistant, and can function as point detonating or with delayed action. It is used on a large number of aerial bomb types by numerous nations.

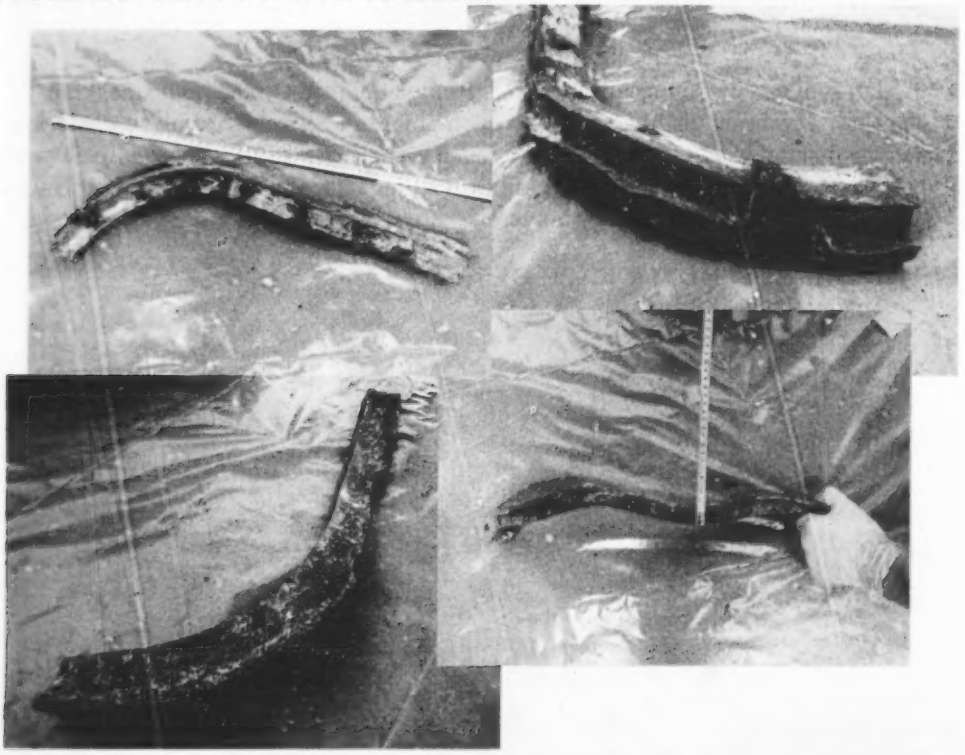
FIGURE A4.5 PHOTOGRAPH OF 10SDS

9. 10SDS comprises four smaller metal pieces. Less rust is visible than on the other items. Fragments are grey with sharp twisted parts and are made of thinner material than most of the other items. The deformations indicate that explosion has torn them off of a larger system. Although the flat lines on the sides, together with the general shape and thickness, indicate that these items could potentially be a part of the tailfin assembly, the exact origin of this part could not be determined.

FIGURE A4.6 PHOTOGRAPH OF 11SDS

10. This item is moderately corroded metal part with visible dark green colour on the surface. It consists of three splintered parts still linked at one point. The thickness of material is approximately 5 mm; the length of individual pieces is approximately 180 to 200 mm, while the estimated total width of the linked part is approximately 320 mm.

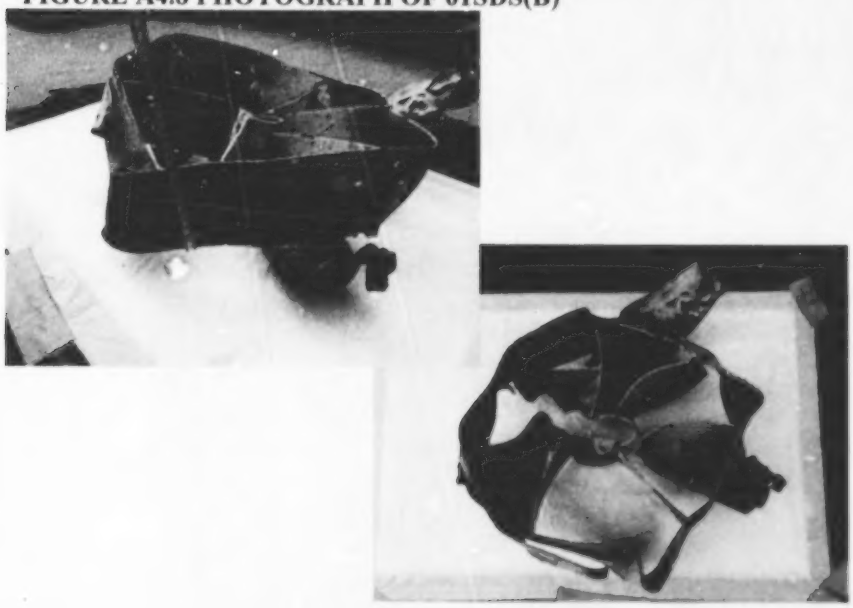
FIGURE A4.7 PHOTOGRAPH OF 12SDS



11. 12SDS is similar to a metal rail, approximately 550 mm long, with a square shaped cross section. It is heavily corroded with eight equally distributed holes visible on one side and traces of grey colour. Some of the holes still contain broken bolts inside. The width of the side with holes is approximately 30 mm, thickness is approximately 20 mm and the distance between two holes

is approximately 65 mm. On one side there is an attached layer of metal, which is approximately 5 mm thick.

FIGURE A4.8 PHOTOGRAPH OF 01SDS(B)

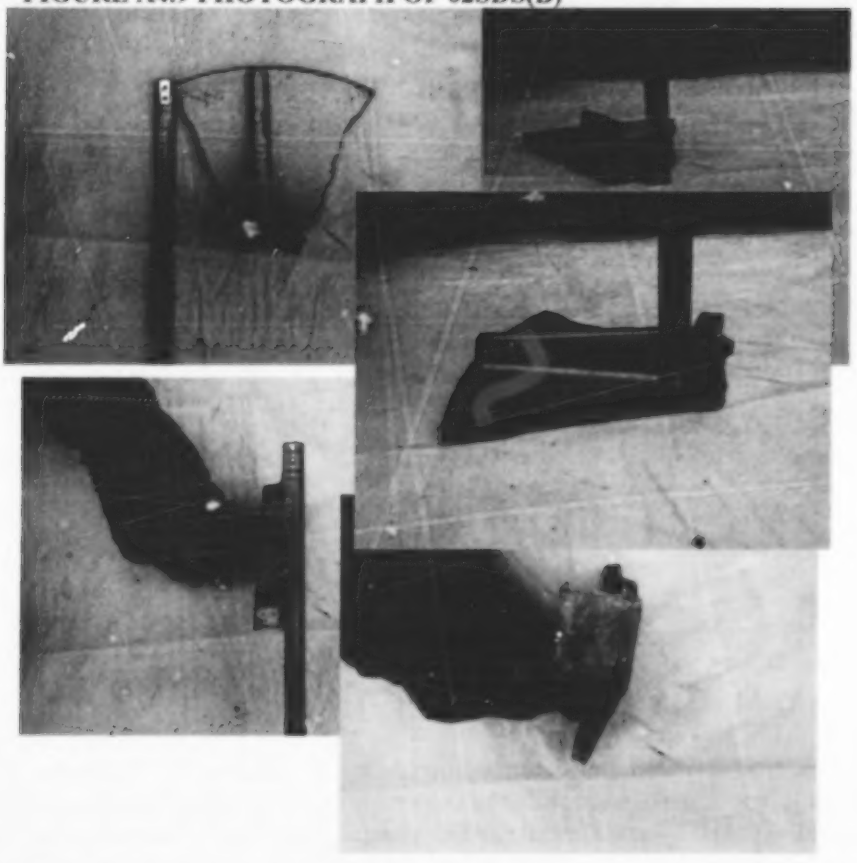


12. 01SDS(B) is a large corroded and deformed metal object. Despite the corrosion, it is still possible to see layers of dark green and grey colour. It is also possible to see a smaller inner ring in the middle, linked by seven metal parts to a larger, outer ring. Four of the parts that are linking rings are rectangular. The other three are much larger and triangular. The spacing between the three parts, in addition to indications on the rings, point to one missing larger triangular part.

13. This is consistent with an aerial bomb tail fin assembly.

14. The FFM took numerous measurements of this item. Given the level of deformation, these measurements are only approximate dimensions. These approximate dimensions have not been included.

FIGURE A4.9 PHOTOGRAPH OF 02SDS(B)



15. 02SDS(B) does not bear traces of corrosion and appears to have a different material of construction to the other parts.

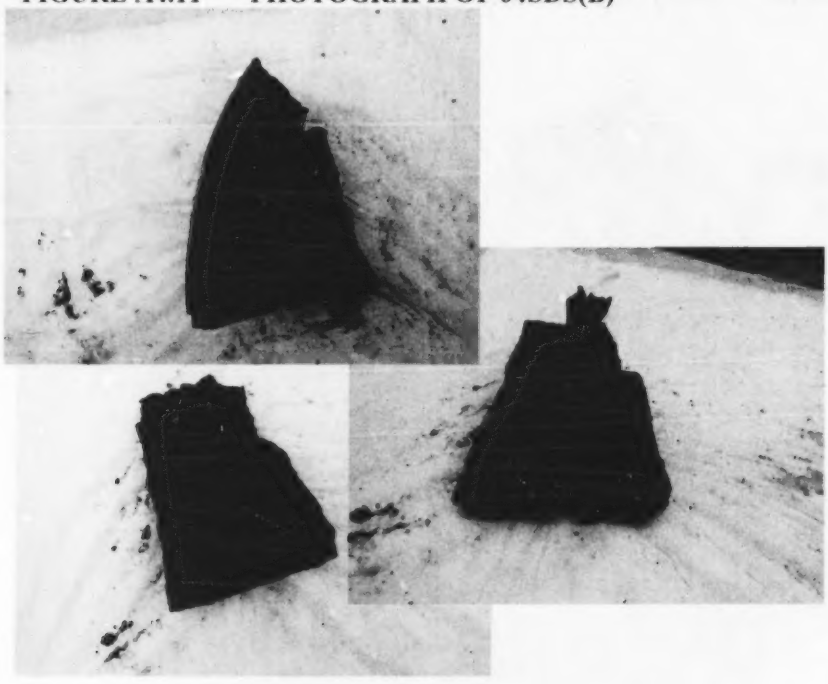
16. It is flat on one side with an enforcement rib on the other. The rough edges indicate it has been torn off of a larger, probably circular part. It is approximately 110 mm in length from the inner curve to the outer.

FIGURE A4.10 PHOTOGRAPH OF 03SDS(B)

17. 03SDS(B) consists of circular part attached to the other, hook-shaped piece of metal. It is heavily corroded however, on the lid of the circular part, and on the welding of the hook-shaped part it is possible to see traces of dark green paint. The circular part looks very similar to the circular part of sample 07SDS (see previously) and has very similar dimensions. The dimensions are therefore not repeated here.

18. The upper part has a circular lid still attached to the assembly. On the lid there are two symmetrical holes, most likely for a fork key or similar such tool used to tighten it. The other part is welded on the base material, to which is also attached a lug shaped piece of metal. The deformations are consistent with the item being torn off the main system.

FIGURE A4.11 PHOTOGRAPH OF 04SDS(B)



19. 04SDS(B) consists of very thick, heavy metal part and another thinner part, which looks like it is been partially peeled off the main body. The items are heavily corroded with dark discoloration on one side. Dimensions of the item are approximately 175 mm on the longer side with approximately 145 mm across, on the widest part. One side of the item is flat with only the bottom part bearing marks of violent splitting. Sides of the larger object are uneven and rough, probably the result of violent separation as well. Thickness of the object varies from approximately 40 mm to 50 mm for the larger part, and approximately from 4 mm to 10 mm at the peeled off part.